Affaires commerciales Canada
Bureau des brevets
Ottawa, Canada
K1A 0C9

Corporate Affairs Canada
Patent Office

(21) (A1) 2,092,281
(22) 1993/03/23
(43) 1993/09/26

5,070,015

(51) INTL.CL.[5] B32B-027/08; C09J-007/02

(19)(CA) **APPLICATION FOR CANADIAN PATENT** (12)

(54) Covered, Pressure-Sensitive Self-Adhesive Carriers, and a Process for the Production Thereof

(72) Beer, Ekkehard - Germany (Federal Republic of) ;
Rentzsch, Tobias - Germany (Federal Republic of) ;

(73) Hoechst Aktiengesellschaft - Germany (Federal Republic of) ;

(30) (DE) P 42 09 676.6 1992/03/25

(57) 19 Claims

Abstract of the Disclosure

A covered pressure-sensitive, self-adhesive carrier in which the carrier is covered by an embossed material, such as a film, on the surface of the carrier which is pressure-sensitive and self-adhesive resulting in a covered carrier wherein the adhesion between the cover and the adhesive can be modified depending on desired need. The cover layer can be removed and recycled.

COVERED, PRESSURE-SENSITIVE SELF-ADHESIVE CARRIERS, AND A PROCESS FOR THE PRODUCTION THEREOF

Background of the Invention

Field of the Invention

The invention relates to materials which have been provided with a self-adhesive coating and have been rendered pressure-sensitive; such as adhesive tapes. The materials are provided on their self-adhesive surface with a covering which can easily be removed, wherein the covering contains no silicone, has high strength, and is recyclable.

The invention also relates to a process of producing such covered materials and to a process of using such a covering.

Description of Related Art

Materials which have been provided with a self-adhesive coating and have been rendered pressure-sensitive, for example adhesive tapes, must frequently be reversibly covered on their adhesive or active surface during production, transport, and storage in order to prevent them from sticking to themselves. In addition, these coverings enable the rolling resistance to be modified in a specific manner, which is of crucial importance, in particular, when adhesive tape rolls are used in automatic packaging machines.

Conventional reversible coverings for adhesive tapes usually have silicone-containing coatings which are adhesive-repellent. However, silicone-containing coverings of this type have a number of disadvantages. Firstly, traces of the silicone remain adhered to the adhesive layer when the covering is removed. The adhered silicone reduces the adhesion of the adhesive when in contact with a new substrate. Secondly, the silicone in the covering prevents recovery and reuse of the pure material used as the covering. Accordingly,

recycling of the covering is impractical, and disposal of materials which have been siliconized in this way must be accomplished by landfilling or incineration. Also, another disadvantage of silicone-containing covers is that thermal conversion is not generally possible for silicone-containing material.

Summary of the Invention

An object of the present invention is to provide a covering for adhesive tapes and other materials having a pressure-sensitive surface or coating which is in no way inferior to siliconized carriers with respect to its property profile, but which does not have the above-described disadvantages of siliconized carriers.

It is also an object of the present invention to provide a process for the production of the covered carrier.

It is also an object of the present invention to provide a process for the use of an embossed film as a covering film for self-adhesive carriers.

In accomplishing the foregoing objectives, there has been provided, in accordance with one aspect of the present invention, a covered carrier comprising a carrier having a surface which is pressure-sensitive and self-adhesive, and an embossed material covering said surface.

In accordance with another aspect of the invention there has been provided a process for using an embossed material as a covering, comprising the step of applying the embossed material to a pressure-sensitive, self-adhesive surface of a carrier.

In accordance with another aspect of the invention, there has been provided a process for the production of a covered carrier, which comprises applying an embossed material to a surface of a carrier which is pressure-sensitive and self-adhesive.

Further objects, features, and advantages of the present invention will become apparent from the detailed description of preferred embodiments that follows.

Detailed Description of the Preferred Embodiments

As the material having the pressure-sensitive, self-adhesive surface, any such material can be used. In particular, pressure-sensitive, self-adhesive carriers, which are sufficiently well known and are described, for example, in EP-A-0 028 771 which is hereby incorporated by reference, can be used.

As the embossed structure, any structure, such as a thermoplastic film, having elevations, can be used. For example, useful embossable polyester films are described in EP-A-0 115 033, which is equivalent to U.S. Patent No. 4,734,335, which is hereby incorporated by reference in its entirety.

U.S. Patent Application 07/947,173 proposes employing the embossed film of EP-A-0 115 033 as a release film for the production of decorative layers with a structured surface. There is no indication in this application of any possible use of such embossed films as a covering for self-adhesive carriers.

A covering in the sense of the invention means a material which protects the adhesive surface of a carrier which has been provided with an adhesive coating. The covering can be removed, if desired, without significantly damaging the adhesive layer and/or the carrier.

In the present invention, a carrier means a structure which inherently has or is provided with, at least on one surface, a self-adhesive coating which bonds the carrier more or less strongly to a substrate by simple exertion of pressure, e.g., in a pressure-sensitive manner. Any such carrier having the described adhesive surface or coating can be used in

the present invention. In particular, the carrier may be an adhesive tape film, which usually comprises a single- or multilayer thermoplastic, such as polyvinyl chloride, polypropylene or polyethylene terephthalate, and has been coated on one side with a pressure-sensitive adhesive. Any known pressure-sensitive adhesives can be used to coat the carrier. Throughout the specification and claims, the term "pressure-sensitive" means that the adhesive effect is achieved simply by the action of pressure without increasing the temperature or adding any additives.

In a preferred embodiment of the present invention, the embossable structure is a film which is a stretched and thermofixed multilayer film made from polyesters having different melting points, comprising two outer polyester layers of polyethylene terephthalate, between which a lower-melting polyester layer made from copolyesters containing ethylene terephthalate and ethylene isophthalate units is embedded. An embossable multilayer film of this type is described in U.S. Patent 4,734,335 the disclosure of which is incorporated by reference. This multilayer film can be produced, for example as an unembossed film, be laminated onto a carrier, for example a book cover, and subsequently embossed under the action of pressure and temperature, producing the desired relief-like pattern.

It has now been found, surprisingly, that this embossable film is highly suitable as a covering film for pressure-sensitive, self-adhesive carriers. To this end, the embossable film of U.S. Patent 4,734,335 is embossed with the desired pattern, for example small elevations uniformly distributed over the film surface. The embossing may be accomplished in any desired manner. The advantage of this film as compared to previously used coverings is, in particular, that it

a) contains no silicone,

b) achieves low adhesion between the adhesive layer and the covering film by minimizing the contact area between covering and adhesive due to the small elevations (embossing) of the covering,

c) has high strength, and

d) is made of a single type material, i.e., polyesters, and is thus recyclable.

The preferred embossable polyester film is a multilayer film whose features are that the film is biaxially stretched and that the middle layer comprises a copolyester preferably containing between about 5 and about 95%, more preferably between about 5 and about 50% by weight, of ethylene isophthalate units. The two outer layers are arranged such that the outer polyester layer from which the embossing proceeds is preferably thinner than the other outer polyester layer.

It has been found that covering the middle layer, which has the lower melting point, by the higher-melting polyester layers makes the embossability very good, that there is no tendency for film to stick to the tool during the embossing process, and that elevated temperatures can be used during the embossing process so that the embossing depth is retained even on exposure to elevated temperatures.

The outer layers are preferably made of the same or different polyethylene terephthalate having a melting point of between about 240 and about 260°C and the middle layer is preferably made from a copolyester having a melting point of between about 190 and about 230°C.

The multilayer embossable film preferably has an asymmetrical structure; that is, the outer polyester layer from which the embossing is carried out (i.e., to which the embossing tool is applied) is thinner than the other outer polyester layer, which is arranged opposite the side from which the embossing is carried out. The thickness of the multilayer film is generally from about 5 to about 1000 μm, preferably from about 10

to about 350 μm, particularly preferably from about 10 to about 200 μm. The outer polyester layer from which the embossing proceeds generally has a thickness of at least about 0.01 μm, preferably from about 0.1 to about 10 μm, very particularly preferably from about 0.1 to about 5 μm. The thickness of the middle layer is generally at least about 0.5 μm, preferably between about 1 and about 100 μm, particularly preferably between about 2 and about 40 μm. The second outer polyester layer arranged opposite the side from which the embossing is carried out generally has a thickness of at least about 1 μm, preferably from about 1 to about 100 μm, particularly preferably from about 5 to about 50 μm.

The preferred embossable film described above can be produced in any desired manner such as coextrusion, biaxially stretching, and thermofixing by conventional processes which are known *per se*.

The embossing may be accomplished in any desired manner. It is only important that the embossed cover has a surface having raised structures such that only the raised structures contact the adhesive surface of the carrier, allowing easier removal of the cover layer. A preferred procedure is to bring the embossable structure or film under sufficient pressure into contact with a structured surface, preferably a roller, whose structure is then transferred to the three-layer film.

Suitable structures have proven to be punctiform or linear elevations having a height of from about 5 to about 50 μm and a mean diameter or width of from about 5 to about 20 μm, distributed uniformly over the entire length and width of the embossing film. The number of these elevations per mm^2 should generally be from about 25 to about 100, depending on the diameter/width of the elevation. In order to produce linear elevations, the embossing film can be provided with a groove-like or corrugated profile in the form of, for example,

concentric rings, or the like. The crucial factor is that the total contact area of the cover to the adhesive surface of the carrier is reduced by impressing or embossing regions on the surface of the carrier, so that a surface carrying only punctiform or web-like elevations is formed. The form of this embossing is of secondary importance.

The application of the covering to the surface provided with a pressure-sensitive, self-adhesive coating is expediently carried out by bringing the two surfaces into contact. In the case of adhesive tapes provided with a self-adhesive coating, the covering is expediently fed to the adhesive tape, as a film tape of the same width as the adhesive tape, on the side coated with adhesive, after production of the tape and just before it is rolled up. The covered carrier is then rolled up together with the adhesive tape and the covering.

Compared with conventional coverings for self-adhesive carriers or compared with adhesive tapes themselves provided on the back with an abherent, the novel combination of embossed covering film and adhesive tape has the following advantages:

a) the entire system contains no silicone,
b) the covering film can be reused or recycled,
c) the adhesion between the self-adhesive carrier and the covering film can be modified within broad limits by appropriate embossing of the covering film, and
d) the covering film used has high strength.

What Is Claimed Is:

1. A covered carrier, comprising a carrier having a surface which is pressure-sensitive and self-adhesive, and an embossed material covering said surface.

2. A covered carrier as claimed in claim 1, wherein said embossed material comprises a thermoplastic film.

3. A covered carrier as claimed in claim 1, wherein the carrier comprises a base member carrying thereon a self-adhesive, pressure-sensitive coating to form said surface.

4. A covered carrier as claimed in claim 3, wherein the base member comprises a thermoplastic film.

5. A covered carrier as claimed in claim 4, wherein the thermoplastic film comprises a polyvinyl chloride, polypropylene, or polyethylene terephthalate film.

6. A covered carrier as claimed in claim 2, wherein the embossed film comprises a polyester film.

7. A covered carrier as claimed in claim 6, wherein the embossed film comprises an embossed, biaxially oriented, thermofixed multilayer film, wherein the film comprises two outer layers comprising polyethylene terephthalate, and an intermediate layer comprising a copolyester containing ethylene terephthalate and ethylene isophthalate units having a lower-melting point than the polyethylene terephthalates.

8. A covered carrier as claimed in claim 7, wherein the copolyester comprises between about 5 and about 95% by weight of ethylene isophthalate units.

9. A covered carrier as claimed in claim 7, wherein an outer layer from which embossing is carried out is thinner than the other outer layer.

10. A covered carrier as claimed in claim 7, wherein the outer layers comprise the same or different polyethylene terephthalate having a melting point between about 240 and about 260°C and the copolyester has a melting point between about 190 and about 230°C.

11. A covered carrier as claimed in claim 2, wherein the overall thickness of the embossable film is from about 5 to about 1000 μm, the thickness of the middle layer being at least about 0.5 μm.

12. A covered carrier as claimed in claim 9, wherein the thickness of the outer layer from which embossing is carried out is between about 0.01 to about 10 μm and the thickness of the other outer layer is between about 1 and about 100 μm.

13. A covered carrier as claimed in claim 2, wherein the embossed film has elevations of from about 5 to about 20 μm in width.

14. A covered carrier as claimed in claim 2, wherein the elevations of the embossed film are punctiform or linear and wherein from about 25 to about 100 elevations are present per mm^2 of the embossed film surface.

15. A covered carrier as claimed in claim 1, wherein the embossed material covering is essentially free of silicone.

16. A covered carrier as claimed in claim 2, wherein the embossed film comprises a recycled film.

17. A covered carrier as claimed in claim 1, wherein the carrier comprises an adhesive tape.

18. A process of using an embossed film as a covering, comprising the step of applying the embossed film to a pressure-sensitive, self-adhesive surface of a carrier.

19. A process for the production of a covered carrier, which comprises applying an embossed film to a surface of a carrier which is pressure-sensitive and self-adhesive.

Fetherstonhaugh & Co.,
Ottawa, Canada
Patent Agents

SUBSTITUTE

REMPLACEMENT

SECTION is not Present

Cette Section est Absente